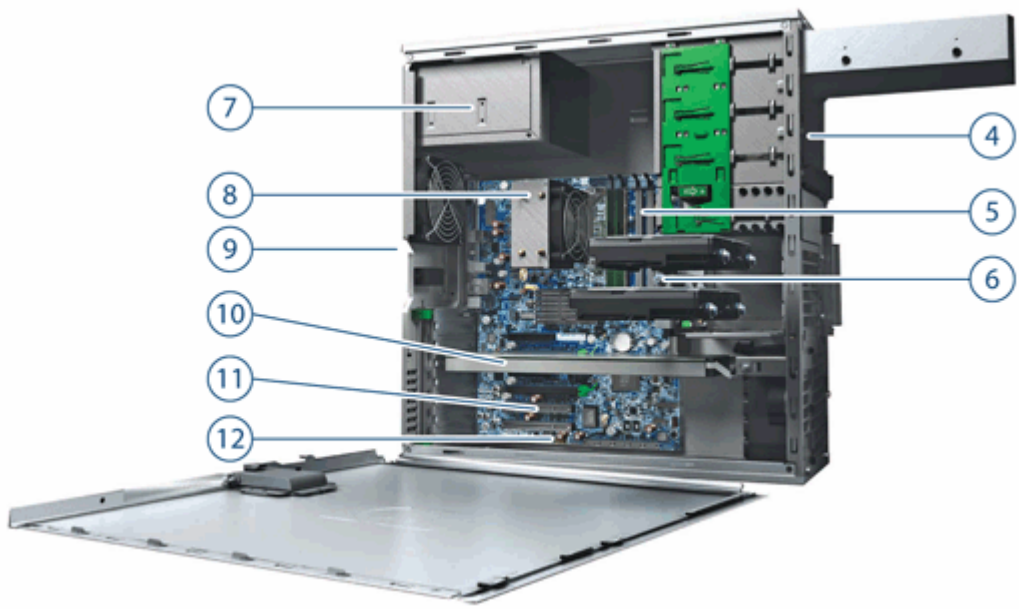
Overview

1. 3 External 5.25" Bays
2. Power Button
3. Front I/O: 2 USB 2.0, 1 IEEE 1394a, Headphone, Microphone

Overview



4. 3 External 5.25" Bays
5. 4-DIMM slots/ 6-DIMM slots (depending on base unit model) for DDR3 ECC memory
6. 2 Internal 3.5" Bays
7. 475W, 85% efficient Power Supply
8. Dual/Quad/Six Core Intel 3500/3600 Series Processors
9. Rear I/O: 6 USB 2.0, PS/2 keyboard/mouse
   1 RJ-45 to Integrated Gigabit LAN
   1 Audio Line In, 1 Audio Line Out, 1 Microphone In
10. 2 PCIe x16 Gen2 Slots
11. 1 PCIe x4 Gen2, 1 PCIe x4 Gen1, 2 PCI Slots
12. 4 Internal USB 2.0 ports

Form Factor	Convertible Minitower
Operating Systems	Genuine Windows® 7 Ultimate 64-Bit* Genuine Windows® 7 Professional 32-Bit* Genuine Windows® 7 Professional 64-Bit* * Systems may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details. HP Linux Installer Kit for Linux [includes drivers for 32-bit & 64-bit OS versions of Red Hat Enterprise Linux(RHEL) 4 Workstation, Red Hat Enterprise Linux (RHEL) 5 Workstation, 32-bit & 64-bit Red Hat Enterprise Linux (RHEL) 6 Workstation, 64-bit Novell SUSE Linux Enterprise Desktop (SLED) 11] See http://www.hp.com/workstations/software/linux for details. Novell SLED 11 Linux preloaded Red Hat Enterprise Linux (as Drop-in-the-box only) For detailed OS/hardware support information for Linux, see: http://www.hp.com/support/linux_hardware_matrix
Available Processors	Intel® Xeon® Processor W3503 2.40 GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core

Overview

	Intel Xeon Processor W3505 2.53 GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core Intel Xeon Processor W3520 2.66 GHz, 8MB cache, 1066 memory, 4.8 GT/s QPI, Quad-Core, HT, Turbo Intel Xeon Processor W3550 3.06 GHz, 8MB cache, 1066 memory, 4.8 GT/s QPI, Quad-Core, HT, Turbo Intel Xeon Processor W3565 3.20 GHz, 8MB cache, 1066 memory, 4.8 GT/s QPI, Quad-Core, HT, Turbo Intel Xeon Processor W3670 3.20 GHz, 12MB cache, 1066 memory, 4.8 GT/s QPI, Six-Core, HT, Turbo Intel Xeon Processor W3680 3.33 GHz, 12MB cache, 1333 memory, 6.4 GT/s QPI, Six-Core, HT, Turbo Intel Xeon Processor W3690 3.46 GHz, 12MB cache, 1333 memory, 6.4 GT/s QPI, Six-Core, HT, Turbo
Available Processor Disclaimers	Intel's numbering is not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: http://www.intel.com/products/processor_number/ for details. 64-bit computing on Intel® 64 architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers and applications enabled for Intel 64 architecture. Processor will not operate (including 32-bit operation) without an Intel 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. See: http://www.intel.com/info/em64t for more information. Dual-Core, Quad-Core and Six-Core technologies are designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefits; check with software provider to determine suitability; Not all customers or software applications will necessarily benefit from use of these technologies.
Chipset	Intel® X58 Express
Convertibility	Yes. 5.25" drives rotate for Minitower or Desktop orientation.
Expansion Slots (see system board section for more details)	• 2 PCI slots (full-height, full-length) • 1 PCI Express Gen1 slot x8 mechanical/x4 electrical • 1 PCI Express Gen2 slot x8 mechanical/x4 electrical • 2 PCI Express Gen2 slots x16 (one dedicated for graphics) NOTE: The PCIe x8 connectors are open ended, allowing a PCIe x16 card to be seated in the slot.
Expansion Bays (see storage section for more details)	• 2 internal 3.5" bays • 3 external 5.25" bays NOTE: Third external 5.25" bay is not full depth; maximum depth 170 mm (6.7 inches)
Memory	PC3-10600 DDR3-1333 ECC Unbuffered DIMMs
Front I/O	2 USB 2.0, 1 IEEE 1394a standard, 1 audio out, and 1 microphone.
Internal I/O	4 USB 2.0 ports available by two separate 2x5 headers: supports either up to two HP Internal USB Port Kits, AMO- EM165AA (one port on each Kit), or up to two USB Media Card Readers, or one Internal Port kit and one USB Media Card Reader.
Rear I/O	6 USB 2.0, 2 USB 3.0 (requires optional PCIe card), 1 optional serial port, 2 optional IEEE 1394a or 1394b ports (requires PCI card), 2 PS/2, RJ-45 (NIC), 1 audio line in, 1 audio line out, 1 microphone in; audio ports can be retasked to function as line in, line out, microphone, or headphone.
Interfaces Supported	22-in-1 Media Card Reader (optional)
Chassis Dimensions (HxWxD)	Standard minitower orientation: 45.02 x 16.79 x 45.53 cm (17.7 x 6.6 x 17.9 in) Converted desktop orientation: 45.02 x 16.79 x 45.53 cm (17.7 x 6.6 x 17.9 in)
Weight	Exact weights depend upon configuration Minimum: 13.5 kg (29.8 lbs) Standard: 15.1 kg (33.2 lbs) Maximum: 19.6 kg (43.2 lbs)

Overview

Temperature	Operating:	5° to 35°C (40° to 95°F)
	Non-operating	-40° to 60°C (-40° to 140°F)
Humidity	Operating:	8% to 85%
	Non-operating	8% to 90%
Maximum Altitude (non-pressurized)	Operating:	3,000 m; 10,000 feet
	Non-operating	9,100 m; 30,000 feet
Power Supply	475 watts wide-ranging, active Power Factor Correction, 85% Efficient The Z400 475W power supply efficiency report can be found at this link: http://www.plugloadsolutions.com/psu_reports/HP_DPS_475CBA_475W_Report.pdf (Optional) 600 watts wide-ranging, active Power Factor Correction, 80% Efficient The Z400 600W power supply efficiency report can be found at this link: http://www.plugloadsolutions.com/psu_reports/HEWLETT%20PACKARD_626322-001_ECOS%202171.1_600W_Report.pdf	
Colour	Jack Black/Alloy metallic	
Tape Backup	For a complete listing of compatible tape offerings, please visit: http://www.hp.com/products1/storage/compatibility/tapebackup/Workstations/index.html	

Supported Components

Processors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Quad/Six-Core Intel® Xeon® Processor 3500/3600 Series with Intel® 64 Architecture				
Intel Xeon W3503, 2.40GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core	Y	N		
Intel Xeon W3505, 2.53GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core	Y	N		
Intel Xeon W3520, 2.66GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo	Y	N		
Intel Xeon W3550, 3.06GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo	Y	N		
Intel Xeon W3565, 3.20GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo	Y	N		
Intel Xeon W3670, 3.20GHz, 12MB cache, 1066 memory, 4.8GT/s QPI, Six-Core, HT, Turbo	Y	N		
Intel Xeon W3680, 3.33GHz, 12MB cache, 1333 memory, 6.4GT/s, Six-Core, HT, Turbo	Y	N		
Intel Xeon W3690, 3.46GHz, 12MB cache, 1333 memory, 6.4GT/s QPI, Six-Core, HT, Turbo	Y	N		

HP Liquid Cooling Option available for all the above processors
Intel's numbering is not a measurement of higher performance.

SAS Hard Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations				
300GB SAS 15K rpm 6Gb/s 3.5" HDD	N	Y	LU967AA	
450GB SAS 15K rpm 6Gb/s 3.5" HDD	N	Y	LU968AA	
600GB SAS 15K rpm 6Gb/s 3.5" HDD	Y	Y	VM647AA	

Sub-Section Description/Notes

NOTE: SAS controller add-in card required

Up to (4) 3.5-inch 15K rpm SAS drives: 300, 450, 600 GB; 2.4 TB max

Removable Boot Drive option

SATA Hard Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
SATA (Serial ATA) Hard Drives for HP Workstations				
160GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	PV944A	
250GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	PY278AA	
320GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	FH963AA	
500GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	PV943A	
1TB SATA 7200 rpm 3.0Gb/s 3.5" HDD	Y	Y	GE262AA	
1.5TB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	VH997AA	

	2.0TB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	WE464AA
	160GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	EW222AA
	300GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	FM802AA
	600GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	XP309AA
	Sub-Section Description/Notes			
	Up to (4) 3.5-inch 7200 rpm SATA drives: 160, 250, 320, 500 GB, 1.0, 1.5, 2.0 TB; 8.0 TB max			
	Up to (4) 2.5-inch 10K rpm SATA drives: 160, 300, 600 GB; 2.4 TB max			
	Removable Boot Drive option			
SATA Solid State Drives	HP Solid State Drives for Workstations			
	HP 160GB SATA X25-M SSD	Y	Y	WV915AA
	HP 160GB SATA SSD	Y	Y	LZ704AA
	For hard drives, 1 GB = 1 billion bytes; TB = 1 trillion bytes. Actual formatted capacity is less.			

Hard Drive Controllers		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	Integrated SATA 3.0 Gb/s Controller				
	Integrated SATA 3.0 Gb/s Controller	Y	N		
	Factory integrated RAID on motherboard for SATA drives				
	RAID 0 Configuration - Striped Array	Y	N		See note 1
	RAID 0 Data Configuration -- Boot/OS Drive + 2 Drive Striped Array	Y	N		See notes 1 and 2
	RAID 1 Configuration - Mirrored Array	Y	N		See note 1
	LSI 9212 4-Port SAS 6Gb/s RAID Card				
	LSI 9212 4-Port SAS 6Gb/s RAID Card	Y	Y	XP310AA	See notes 2 and 3
	LSI MegaRAID® SAS 8888ELP Host Bus Adapter (HBA)				
	LSI 8888ELP 8-port SAS HW RAID Card	N	Y	GE258AA	
	LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card and iBBU08 Battery Backup Unit				
	LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card	N	Y	WE465AA	
	Optional: LSI iBBU08 Battery Backup Unit for LSI 9260-8i	N	Y	LA783AA	

NOTE 1: All drives must be identical in size, speed, and type for RAID arrays.
Specific user-configured hardware SAS RAID configurations are supported on Linux systems. Please visit: http://www.hp.com/support/linux_hardware_matrix for details.
NOTE 2: In RAID 0 Data Configuration, Boot/OS Drive must be SATA.
NOTE 3: Specific user-configured hardware SAS RAID configurations are supported on this Linux system. Please visit: http://www.hp.com/support/linux_hardware_matrix for details.
SATA hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance and is a good alternative to hardware-based RAID. Please visit: http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf for RAID capabilities with Linux.

Supported Components

All RAID arrays must be less than 2 TB, except for SATA RAID 0 Data Arrays.

Graphics		Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported Multi Mixed
	Professional 2D					
	NVIDIA Quadro NVS 295 256MB PCIe Graphics Card	Y	Y	FY943AA	If 1st graphics card is NVS 295 then 2nd graphics card must be NVS 295	2
	NVIDIA NVS300 512MB PCIe Graphics Card	Y	Y	XP612AA	If 1st graphics card is NVS 300 then 2nd graphics card must be NVS 300	2
	AMD FirePro 2270 512MB Graphics Card	Y	Y	LA524AA	If 1st graphics card is AMD FirePro 2270 then 2nd graphics card must be AMD FirePro 2270	2
	NVIDIA Quadro NVS 450 512 MB PCIe Graphics Card	Y	Y	FH519AA	If 1st graphics card is NVS 450 then 2nd graphics card must be NVS 450, NVS 295, or NVS 300	2
	Entry 3D					
	NVIDIA Quadro FX 380 256MB PCIeGraphics Card	Y	Y	NB769AA		2
	NVIDIA Quadro 400 512MB Graphics Card	Y	Y	LD542AA		2
	NVIDIA Quadro 600 1GB Graphics Card	Y	Y	WS093AA		2
	ATI FirePro V3800 512MB PCIe Graphics Card	Y	Y	WL048AA		2
	ATI FirePro V4800 1GB Graphics Card	Y	Y	WL049AA		2
	Mid-range 3D					
	NVIDIA Quadro 2000 1GB Graphics Card	Y	Y	WS094AA		2
	ATI FirePro V5800 1GB Graphics Card	Y	Y	WL050AA		2
	AMD FirePro V5900 2GB Graphics	Y	Y	LS992AA		2
	High End 3D					

Supported Components

NVIDIA Quadro FX 4800 1.5GB PCIe Graphics Card	Y	Y	FQ138AA	1
NVIDIA Quadro 4000 2GB Graphics Card	Y	Y	WS095AA	1
NVIDIA Quadro 5000 2.5GB Graphics Card	Y	Y	WS096AA	1
AMD FirePro V7900 2GB Graphics	Y	Y	LS993AA	1

High Performance GPU Computing	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
NVIDIA Tesla C2050 Compute Processor	Y	Y	WT428AA	Supported only with 600W PSU

Memory	CTO	Option Kit Part Number	Support Notes
	PC3-10600 DDR3-1333 ECC Unbuffered DIMMs CTO		
	1GB (1x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	2GB (2x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	3GB (3x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	4GB (4x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	4GB (2x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	6GB (3x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	8GB (2x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	8GB (4x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	12GB (3x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	12GB (6x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		Available only with 6-DIMM base unit
	16GB (4x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	24GB (6x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		Available only with 6-DIMM base unit

Sub-Section Description/Notes

NOTE:DIMMs should be distributed across all three memory channels for optimal performance. Each processor supports up to 3 channels of DDR3 memory. To realize full performance at least 1 DIMM must be inserted into each channel.

The CPUs determine the speed at which the memory is clocked. If a 1066MHz capable CPU is used in the system, the maximum speed the memory will run at is 1066MHz regardless of the specified speed of the memory.

AMO

PC3-10600 DDR3-1333 ECC Unbuffered DIMMs AMO	
1GB (1x1GB) DDR3-1333 ECC Unbuffered RAM	FX698AA
2GB (1x2GB) DDR3-1333 ECC Unbuffered RAM	FX699AA
4GB (1x4GB) DDR3-1333 ECC Unbuffered RAM	NL797AA

Supported Components

NOTE: Only unbuffered DDR3 DIMMs are supported.

Multimedia and Audio Devices	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Intel/Realtek HD ALC262 Audio	Y	N		
HP Thin USB Powered Speakers	Y	Y	KK912AA	
Creative X-Fi Titanium PCIe Audio Card	Y	Y	NH222AA	See note 1

NOTE 1: The SoundBlaster X-Fi Titanium audio card is supported on the HP Z Series Workstations with Microsoft Windows XP Pro 32-bit and 64-bit and Microsoft Vista 32-bit and 64-bit versions. Linux is not supported.

Optical and Removable Storage	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP 16X DVD-ROM SATA Drive	Y	Y	AR629AA	See note 1
HP 16X DVD+-RW SuperMulti SATA Drive	Y	Y	AR630AA	
HP Blu-ray Writer	Y	Y	AR482AA	
HP 22-in-1 Media Card Reader Kit (Workstations)	Y	Y	NK361AA	

NOTE 1: Not supported as a 2nd drive option.

Actual speeds may vary. Does not permit copying of commercially available DVD movies or other copyright protected materials. Intended for creation and storage of your original material and other lawful uses. Double Layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players. As Blu-ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.

Controller Cards	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP FireWire/IEEE 1394a PCI Card	Y	Y	PA997A	
HP IEEE 1394b FireWire PCIe Card	Y	Y	NK653AA	
HP SuperSpeed USB 3.0 PCIe x1 Card	Y	Y	BM867AA	

Supported Components

Monitors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP LP2065 20-inch LCD Monitor	Y	Y	EF227A	
HP LP2475w 24-inch Widescreen LCD Monitor	Y	Y	KD911A	
HP DreamColor LP2480zx Professional Display	Y	Y	GV546A	
HP LP3065 30-inch Widescreen LCD Monitor	Y	Y	EZ320A	
HP ZR22w 21.5-inch S-IPS LCD Monitor	Y	Y	VM626A4	
HP ZR24w 24-inch S-IPS LCD Monitor	Y	Y	VM633A4	
HP ZR30w 30-inch S-IPS LCD Monitor	Y	Y	VM617A4	

Supported by all Operating Systems available from HP

Screen Size Diagonally Measured

Networking and Communications

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Broadcom 5764 PCIe LOM Controller	Y	N		
Broadcom NetXtreme Gigabit Ethernet Plus NIC (PCIe)	Y	Y	FS215AA	See note 1
Intel Gigabit CT Desktop NIC	N	Y	FH969AA	

NOTE 1: This is a PCI Express card based on the Broadcom 5761 chip.

"Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

The Broadcom (5761) NetXtreme Gigabit Ethernet Plus NIC and the Intel Gigabit CT NIC are supported on the following operating systems:
Red Hat Enterprise Linux(RHEL) WS4, 5 Desktop/Workstation Novell SLED 10 & 11

Racking and Physical Security

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Security Cable with Kensington Lock	N	Y	PC766A	
HP Solenoid Hood Lock & Hood Sensor	Y	N		
HP (CMT) Solenoid Lock	N	Y	DE618A	
HP xw4/Z4 Depth Adjustable Fixed Rail Rack Kit	N	Y	EK729AA	

Supported Components

Input Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP PS/2 Standard Keyboard	Y	Y	DT527A	
HP USB Standard Keyboard	Y	Y	DT528A	
HP PS/2 Optical Scroll Mouse	Y	Y	EY703AA	
HP USB 2-Button Optical Scroll Mouse	Y	Y	DC172B	
HP USB Laser Mouse	Y	Y	GW405AA	
HP USB Optical 3-Button Mouse	Y	Y	DY651A	
HP USB Smart Card Keyboard	N	Y	ED707AA	
HP 2.4GHz Wireless Keyboard & Mouse	N	Y	NB896AA	
HP USB Optical 3-Button 2.9M OEM Mouse	N	Y	ET424AA	
HP SpaceExplorer 3D USB Controller	N	Y	RY429AA	
HP SpacePilot 3D USB Intelligent Controller	N	Y	EF390AA	

Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Configure minitower in desktop orientation	Y	N		
HP ENERGY STAR 5.0 Enabled Configuration	Y	N		
HP Workstation Mouse Pad	Y	N		Japan only.
HP eSATA PCI Cable Kit	Y	Y	GM110AA	
HP Power Cord Kit	N	Y	DM293A	
HP Serial Port Adapter	N	Y	PA716A	
HP Internal USB Port Kit	N	Y	EM165AA	
HP Optical Bay HDD Mounting Bracket	N	Y	NQ099AA	
HP Workstation to LTO SAS Int. Cable	N	Y	EH925A	
HP Z4 Fan and Front Card Guide Kit	Y	Y	VH190AA	

Supported Components

Software

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Performance Advisor	Y	N		
Roxio Easy Media Creator (DVD/Blu-ray Disc burner software)	Y	N		
Intervideo WinDVD (DVD player/burner software)	Y	N		
HP ProtectTools Security	Y	N		See note 1
PDF Complete - Trial Edition	Y	N		
HP Client Manager Software v6.2 (optional download)	Y	N		
HP Power Assistant	Y	N		
MS Office Home & Business 2010	Y	N		

NOTE 1: Must select as a Configure to Order Option. Delivered as a "Drop in the Box" CD

Operating Systems

	Support Notes
Genuine Windows® 7 Ultimate 64-bit	See note 1
Genuine Windows® 7 Professional 32-bit	See note 1
Genuine Windows® 7 Professional 64-bit	See note 1
HP Linux Installer Kit	See note 2
Red Hat Enterprise Linux (RHEL) Workstation - Paper License (1yr)	See note 3
Novell SLED 11 Linux	

NOTE 1: See http://www.microsoft.com/windows/windows-7/ for support details.
NOTE 2: See: http://www.hp.com/workstations/software/linux
NOTE 3: This second OS must be ordered with the HPIKL as the first OS.

	NOTE: Restricted Material Usage updated to match GSE.
System Board	
System Board Form Factor	ATX 243.84 x 304.8 mm (9.6 x 12 inches)
Processor Socket	Single LGA1366
CPU Bus Speed	QPI: Up to 6.4GT/sec
Chipset	Intel® X58 Express
Super I/O Controller	SMSC SCH5327, Rev B
Memory Expansion Slots	6 DDR3 memory slots
Memory Type Supported	DDR3, UDIMM (Unbuffered), ECC
Memory Modes	Channel Interleaved
Memory Speed Supported	800MHz, 1066MHz, and 1333MHz DDR3
Memory Protection	ECC available on data, parity on address and command

Memory Size (GB)	HP Z400 4-DIMM				HP Z400 6-DIMM					
	DIMM1	DIMM2	DIMM3	DIMM4	DIMM1	DIMM2	DIMM3	DIMM4	DIMM5	DIMM6
1	1 GB				1 GB					
2	1 GB	1 GB			1 GB	1 GB				
3	1 GB	1 GB	1 GB		1 GB	1 GB	1 GB			
4	1 GB	1 GB	1 GB	1 GB	1 GB	1 GB	1 GB	1 GB		
4	2 GB	2 GB			2 GB	2 GB				
6	2 GB	2 GB	2 GB		2 GB	2 GB	2 GB			
8	2 GB	2 GB	2 GB	2 GB	2 GB	2 GB	2 GB	2 GB		
8	4 GB	4 GB			4 GB	4 GB				
12	NA				2 GB	2 GB	2 GB	2 GB	2 GB	2 GB
12	4 GB	4 GB	2 GB	2 GB	4 GB	4 GB	2 GB	2 GB		
12	4 GB	4 GB	4 GB		4 GB	4 GB	4 GB			
16	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB		
24	NA				4 GB	4 GB	4 GB	4 GB	4 GB	4 GB

Memory Configuration (Supported)	• The 4GB DIMM for Z400 and Z600 is NOT compatible with the 4GB DIMMs offered on the Z800. • They are NOT interchangeable. • Only ECC DIMMs are supported.
Note on Maximum Memory	*Maximum memory capacities assume 64-bit operating systems, such as genuine Windows® Vista Business 64, XP Professional x64 Edition, Red Hat Linux 64-bit. Genuine Windows Vista Business 32 and XP Professional (32-bit) support up to 4 GB. 32-bit Linux supports up to 8 GB.
PCI Express Connectors	2 x16 PCIe Gen2 1 x8 PCIe (x4)Gen2 1 x8 PCIe (x4) Gen1
PCI Connectors (5.0V)	2 PCI

System Technical Specifications

Supported Drive Interfaces	SATA	Integrated 6-channel SATA 3.0Gb/sec controller with RAID 0, 1, 5, 10 and NCQ. (Factory integrated RAID is Microsoft Windows only)
Serial Attached SCSI	Hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf for RAID capabilities with Linux.	
Integrated RAID	NOTE: Requires identical hard drives (speeds, capacity, interface)	
Integrated Graphics	No	
Network Controller	Integrated HP Gbit LAN by Broadcom with the following management capabilities: WOL, PXE 2.1, and ASF 2.0	
External SATA (eSATA)	4 ports are eSATA configurable with optional eSATA After-Market Option cable kit.	
IDE connector	No	
Floppy connector	Yes	
Audio	High Definition Integrated Realtek ALC262 Audio with Line in, Line Out, Microphone, Headphone	
CD-ROM input (Audio)	No	
AUX INPUT (Audio)	Yes	
IEEE 1394 Connector(s)	Front	6-DIMM Z400: 1 IEEE 1394a standard
	Rear	2 optional IEEE 1394a or IEEE 1394b, requires optional PCI card
	Internal	No
USB Connector(s)	Front	2 USB 2.0
	Rear	6 USB 2.0; 2 USB 3.0, requires optional PCIe card
	Internal	4 USB 2.0 ports available by two separate 2x5 headers: supports either up to two HP Internal USB Port Kits, AMO-EM165AA (one port on each Kit), or up to two USB Media Card Readers, or one Internal Port kit and one USB Media Card Reader.
HD Integrated Audio	High Definition Integrated Realtek ALC262 Audio with Line in, Line Out, Microphone, Headphone	
Flash ROM	Yes	
Clear Fan Header	No	
CPU Fan Header	Yes	
Chasiss Fan Header	1 Rear System Chassis Fan Header, 1 Optional Front Chassis Fan Header	
Front PCI Fan Header	Yes	
Front Control Panel/Speaker Header	Yes	
CMOS Battery Holder - Lithium	Yes	
Integrated Trusted Platform Module	Integrated TPM 1.2	
Power Supply Headers	Yes	
Power Switch, Power LED & Hard Drive LED Header	Yes	
Clear Password Jumper	Yes	

Serial Port	Single Port (Requires optional Serial Port Adapter)
Parallel Port	No
Keyboard/Mouse	USB or PS/2
Hood Lock Header	Yes
Hood Sensor Header	Yes

Z400 Required power supply info

Power Supply	475W Custom PSU - (Wide Ranging, Active PFC)		600W Custom PSU - (Wide Ranging, Active PFC)	
Operating Voltage Range	90 - 269 VAC		90 - 269 VAC	
Rated Voltage Range	100 - 127 VAC 200 - 240 VAC	118 VAC	100 - 127 VAC 200 - 240 VAC	118 VAC
Rated Line Frequency	50-60 Hz	400Hz	50-60 Hz	400Hz
Operating Line Frequency Range	47 - 66 Hz	393-407 Hz	47 - 66 Hz	393-407 Hz
Rated Input Current	10A @ 100-127 VAC 6A @ 200-240 VAC	10A @ 118 VAC	10A @ 100-127 VAC 6A @ 200-240 VAC	10A @ 118 VAC
Heat Dissipation (Configuration & software dependent)	Typical 954 btu/hr (240.3 kg-cal/hr) Max 1977 btu/hr (498.2 kg-cal/hr)		Typical 1536 btu/hr (387 kg-cal/hr) Max 2560 btu/hr (645 kg-cal/hr)	
Power Supply Fan	92x25 mm variable speed		92x25 mm variable speed	
ENERGY STAR Qualified (Configuration dependent)	YES		NO	
80 PLUS® Compliant	YES, 85%		YES, 80%	
FEMP Standby Power Compliant @115V (Wake-on LAN disabled) (<2W in S5 - Power Off)	YES		YES	
EuP Compliant @ 230V (<1 W in S5 - Power Off)	YES		YES	
Power Consumption in sleep mode (as defined by ENERGY STAR) - Suspend to RAM (S3) (Instantly Available PC) measured at 115V.	<6W		<6W	
Built-in Self Test LED	YES		YES	
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	YES		YES	

System Configuration

System Technical Specifications

Example Configuration #1	*Processor Info* Memory Info Graphics Info Disks/Optical/Floppy PSU	1x Intel Xeon W3503 1x1GB DDR3 1333 (UDIMM) NVS295 1x160GB SATA / 1 Optical / 0 Floppy 475W 85%					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	86.23 W		85.26 W		85.90 W	
	Windows Busy Typ (S0)	140.90 W		137.85 W		140.40 W	
	Windows Busy Max (S0)	153.20 W		152.96 W		155.00 W	
	Sleep (S3)	4.17 W	3.96 W	4.03 W	3.79 W	4.14 W	3.90W
	Off (S5)	1.25 W	1.14 W	1.51 W	1.35 W	1.23 W	1.12 W
	Zero Power Mode (EuP)	0.31 W		0.61 W		0.29W	
Heat Dissipation**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	294.30 btu/hr		290.99 btu/hr		293.18 btu/hr	
	Windows Busy Typ (S0)	480.89 btu/hr		470.48 btu/hr		479.19 btu/hr	
	Windows Busy Max (S0)	522.87 btu/hr		522.05 btu/hr		529.02 btu/hr	
	Sleep (S3)	14.2 btu/hr	13.5 btu/hr	13.8 btu/hr	12.9 btu/hr	14.1 btu/hr	13.3 btu/hr
	Off (S5)	4.27 btu/hr	3.89 btu/hr	5.15 btu/hr	4.61 btu/hr	4.20 btu/hr	3.82 btu/hr
	Zero Power Mode (EuP)	1.04 btu/hr		2.06 btu/hr		0.98 btu/hr	

Example Configuration #2	*Processor Info* Memory Info Graphics Info Disks/Optical/Floppy PSU	1 x Intel Xeon W3570 4x4GB DDR3 1333MHz (UDIMM) 1xFX4800 4x450GB SAS / 1 Optical / 0 Floppy 475W 85%					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	180.70 W		178.30 W		181.00 W	
	Windows Busy Typ (S0)	404.60 W		393.20 W		407.50 W	
	Windows Busy Max (S0)	482.80 W		469.10 W		488.60 W	
	Sleep (S3)	4.84 W	4.65 W	5.13 W	4.94 W	4.85 W	4.66 W
	Off (S5)	1.18 W	1.07 W	1.61 W	1.37 W	1.16 W	1.05W
	Zero Power Mode (EuP)	0.32 W		0.61 W		0.29 W	
Heat Dissipation**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	616.73 btu/hr		608.54 btu/hr		617.75 btu/hr	
	Windows Busy Typ (S0)	1380.90 btu/hr		1341.99 btu/hr		1390.80 btu/hr	
	Windows Busy Max (S0)	1647.80 btu/hr		1601.04 btu/hr		1667.59 btu/hr	
	Sleep (S3)	16.5 btu/hr	15.9 btu/hr	17.5 btu/hr	16.9 btu/hr	16.6 btu/hr	15.9 btu/hr
	Off (S5)	4.03 btu/hr	3.65 btu/hr	5.49 btu/hr	4.68 btu/hr	3.96 btu/hr	3.58 btu/hr
	Zero Power Mode (EuP)	1.08 btu/hr		2.06 btu/hr		0.98 btu/hr	

System Technical Specifications

Example Configuration #3	*Processor Info* Memory Info Graphics Info Disks/Optical/Floppy PSU	1 x Intel Xeon W3520 3x1GB DDR3 1333MHz (UDIMM) 1xFX1800 1x250GB SATA / 1 Optical / 0 Floppy 475W 85%					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	96.70 W		95.10 W		97.71 W	
	Windows Busy Typ (S0)	237.99 W		233.03 W		239.04 W	
	Windows Busy Max (S0)	268.79 W		267.95 W		274.90 W	
	Sleep (S3)	3.89 W	3.65 W	4.20 W	3.96 W	3.83 W	3.61 W
	Off (S5)	1.20 W	1.06 W	1.51 W	1.35 W	1.17 W	1.02 W
	Zero Power Mode (EuP)	0.31 W		0.60 W		0.29 W	
Heat Dissipation**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	330.04 btu/hr		324.58 btu/hr		333.48 btu/hr	
	Windows Busy Typ (S0)	812.26 btu/hr		795.33 btu/hr		815.84 btu/hr	
	Windows Busy Max (S0)	917.38 btu/hr		914.51 btu/hr		938.23 btu/hr	
	Sleep (S3)	13.3 btu/hr	12.5 btu/hr	14.3 btu/hr	13.5 btu/hr	13.1 btu/hr	12.3 btu/hr
	Off (S5)	4.10 btu/hr	3.60 btu/hr	5.15 btu/hr	4.61 btu/hr	3.99 btu/hr	3.48 btu/hr
	Zero Power Mode (EuP)	1.05 btu/hr		2.05 btu/hr		0.97 btu/hr	

Example Configuration #4	*Processor Info* Memory Info Graphics Info Disks/Optical/Floppy PSU	1 x Intel Xeon W3680 6x2GB DDR3 1333MHz (UDIMM) 1xTesla C2050 2x500GB SATA / 1 Optical / 0 Floppy 600W 80%					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	114.11 W		112.80 W		113.10 W	
	Windows Busy Typ (S0)	411.11 W		403.4 W		409.50 W	
	Windows Busy Max (S0)	460.0 W		460.40 W		458.10 W	
	Sleep (S3)	3.67 W	3.41 W	4.12 W	3.85 W	3.64 W	3.41 W
	Off (S5)	1.19 W	1.05 W	1.61 W	1.47 W	1.15 W	1.01 W
	Zero Power Mode (EuP)	0.38 W		0.79 W		0.35W	
Heat Dissipation**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	389.46 btu/hr		384.99 btu/hr		386.01 btu/hr	
	Windows Busy Typ (S0)	1403.12 btu/hr		1376.80 btu/hr		1397.62 btu/hr	
	Windows Busy Max (S0)	1569.98 btu/hr		1571.35 btu/hr		1563.50 btu/hr	
	Sleep (S3)	12.53 btu/hr	11.64 btu/hr	14.06 btu/hr	13.14 btu/hr	12.42 btu/hr	11.64 btu/hr
	Off (S5)	4.06 btu/hr	3.58 btu/hr	5.49 btu/hr	5.02 btu/hr	3.92 btu/hr	3.45btu/hr
	Zero Power Mode (EuP)	1.31 btu/hr		2.69 btu/hr		1.19 btu/hr	

System Technical Specifications

Example Configuration #5 (ENERGY STAR Qualified)	*Processor Info* Memory Info Graphics Info Disks/Optical/Floppy I/O PSU	1x Intel Xeon W3570 4x2GB DDR3 1333MHz (UDIMM) 1 x FX4800 2x1000GB SATA / 1 Optical / 0 Floppy 1xBroadcom 5761 Gigabit PCIe NIC 475W 85%					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	On-Idle (ENERGY STAR® Idle (S0))	99.8 W		97.7 W		100.3 W	
	ENERGY STAR® PMAX **Windows running Linpack and Viewperf**	323.1 W		316.6 W		325.4 W	
	ENERGY STAR® "Sleep" (S3)	4.6 W	-	4.8 W	-	4.6 W	-
	ENERGY STAR® "Standby" (Off) (S5)	1.8 W	-	2.1 W	-	1.7 W	-
Heat Dissipation**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	On-Idle (ENERGY STAR® Idle (S0))	340.6 btu/hr		333.5 btu/hr		342.3 btu/hr	
	ENERGY STAR® PMAX **Windows running Linpack and Viewperf**	1102.7 btu/hr		1080.6 btu/hr		1110.6 btu/hr	
	ENERGY STAR® "Sleep" (S3)	15.7 btu/hr	-	16.4 btu/hr	-	15.7 btu/hr	-
	ENERGY STAR® "Standby" (Off) (S5)	1.8 btu/hr	-	2.1 btu/hr	-	1.7 btu/hr	-

NOTES:
* Energy Star low energy mode
** Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.
This product is in compliance with US executive order 13221, WOL (wake on LAN) disabled.

Declared Noise Emissions (Entry-level and High-end configurations)		
System Configuration (Entry level)	Processor Info	Intel Xeon Processor W3505 2.53 GHz
	Memory Info	4 x 1GB DDR3 1333 MHz
	Graphics Info	NVIDIA Quadro NVS 295
	Disks/Optical/Floppy	1 x 160 GB 7200 RPM SATA / DVD-ROM / No Floppy

System Technical Specifications

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)	Deskside Sound Pressure
	Idle	3.9 Bels	23 dB
	SATA Hard drive Operating (random reads)	4.2 Bels	25 dB
	Floppy Drive Operating (continuous copy)	4.7 Bels	29 dB
	DVD-ROM Operating (sequential reads)	5.1 Bels	38 dB

System Configuration (High-end)		
	Processor Info	Intel Xeon Processor W3570 3.20 GHz
	Memory Info	4 x 1GB DDR3 1333 MHz
	Graphics Info	NVIDIA Quadro FX 4600
	Disks/Optical/Floppy	2 x 450 GB 15K SAS / DVD-ROM / No Floppy

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)	Deskside Sound Pressure
	Idle	4.6 Bels	27 dB
	SATA Hard drive Operating (random reads)	5.2 Bels	35 dB
	Floppy Drive Operating (continuous copy)		
	DVD-ROM Operating (sequential reads)	5.3 Bels	38 dB

Environmental Requirements		
	Temperature	Operating: 5° to 35° C (40° to 95° F) Non-operating: -40° to 60° C (-40° to 140° F)
	Humidity	Operating: 8% to 85% RH, non-condensing Non-operating: 8% to 90% RH, non-condensing
	Maximum Altitude	Operating: 3,000 m (10,000 feet) Non-operating: 9,100 m (30,000 feet)
	Dynamic (new)	Shock Operating: ½-sine: 40g, 2-3ms Non-operating: ½-sine: 160 cm/s, 2-3ms (~100g) square: 422 cm/s, 20g NOTE: Values represent individual shock events and do not indicate repetitive shock events. Vibration Operating random: 0.5g (rms), 5-300 Hz Non-operating random: 2.0g (rms), 10-500 Hz NOTE: Values do not indicate continuous vibration.
	Cooling	Above 1524 m (5,000 ft) altitude, maximum operating temperature is de-rated by 1° C (1.8° F) per 305 m (1,000 ft) elevation increase

Physical Security and Serviceability	
Access Panel	Tool-less Includes system board and memory information
Optical Drive	Tool-less
Floppy Drive	Tool-less
Hard Drives	Tool-less
Expansion Cards	Tool-less
Processor Socket	Tool-less
Green User Touch Points	Yes, on tool-free internal chassis components
Colour-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Tool-less
Dual Colour Power and HD LED on Front of Computer	Yes
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes
Restore CD Set	Restores the computer to its original factory shipping image - Can be obtained via HP Support
Dual Function Front Power Switch	Yes, causes a fail-safe power off when held for 4 seconds
Padlock Support	Yes (optional): Locks side cover and secures chassis from theft 5.56 mm (0.2188 in) diameter padlock loop at rear of system
Cable Lock Support	Yes, Kensington Cable Lock (optional): Locks side cover and secures chassis from theft 3 mm x 7 mm slot at rear of system
Universal Chassis Clamp Lock Support	Yes (optional): Locks side cover and locks cables to chassis. Secures chassis from theft and allows multiple units to be chained together when used with optional cable Threaded feature at rear of system
Solenoid Lock and Hood Sensor	Yes (optional) The Solenoid Hood Lock eliminates the need for a physical key by making the chassis lockable through software and a password. You can also lock and unlock the chassis remotely over the network. The Sensor Kit detects when the access panel has been removed
Rear Port Control Cover	Yes, locks rear IO cables to prevent cable theft
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Yes, enables or disables serial, USB, audio, and network ports
Removable Media Write/Boot Control	Yes, prevents ability to boot from removable media on supported devices (and can disable writes to media)
Power-On Password	Yes, prevents an unauthorized person from booting up the workstation
Setup Password	Yes, prevents an unauthorized person from changing the workstation configuration
3.3V Aux Power LED on System PCA	Yes

System Technical Specifications

NIC LEDs (integrated) (Green & Amber)	Yes
CPUs and Heatsinks	A T-15 Torx or flat blade screwdriver is needed to remove the CPU heatsink before the CPU can be removed. CPU removal is tool-less
Power supply diagnostic LED	Yes
Power Button	Yes, ACPI multi-function
Power LED	Yes, blue (normal), red (fault)
Hard drive activity LED	Yes, green
Internal speaker	Yes
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS.
Alert Standard Format (ASF) Specification	Version 2.0 support Industry-standard specification for network alerting in operating system-absent environments
Cooling Solutions	Air cooled forced convection, Optional processor liquid cooling solution
Power Supply Fans	92 mm x 92 mm x 25 mm 2-wire (non-serviceable)
CPU Heatsink Fan(s)	Mainstream (<=95W): 80 mm x 80 mm x 15 mm 5-wire PWM Performance (>95W): 92 mm x 92 mm x 25 mm 5-wire PWM
Chassis Fans	92 mm x 92mm x 25 mm 4-wire PWM
Memory Fans	No
HP Vision Diagnostics Offline Edition	HP Vision Diagnostics Offline Edition The diagnostics utility enables you to perform testing and to view critical computer hardware and software configuration information from various sources. This utility enables you to: ● Run diagnostics ● View the hardware configuration of the system Key features and benefits HP Vision Diagnostics simplifies the process of effectively identifying, diagnosing, and isolating the hardware issues. In addition to robust management tools, service tools can be invaluable in quickly resolving system problems. To streamline the service process and resolve problems quickly, it is necessary to have the right information available at the time that a service call is placed. The primary information requirement, which is also the one that provides the greatest Vision into potential system issues, is the configuration of the system. Vision Diagnostics helps provide higher system availability. Typical uses of the Vision Diagnostics are: ● Testing and diagnosing apparent hardware failures ● Documenting system configurations for upgrade planning, standardization, inventory tracking, disaster recovery, and maintenance ● Sending configuration information to another location for more in-depth analysis
Access Panel Key Lock	No
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). ● Allows the system to wake from a low power mode. ● Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system

Trusted Platform Module Chip with optional ProtectTools Software	Yes, Infineon SLB9635TT1.2
Integrated Chassis Handles	No
Power Supply	Requires T15 Torx or flat blade screwdriver
PCI Card Retention	Yes, rear (all), middle (none), front (full-length cards with extender)
Flash ROM	Yes
Diagnostic Power Switch LED on board	Yes
Clear Password Jumper	Yes
Clear CMOS Button	Yes
CMOS Battery Holder for easy Replacement	Yes
DIMM Connectors for easy Upgrade	Yes
HP ProtectTools Security Manager	Yes - Not supported on Microsoft XP x64 or Linux

BIOS	
BIOS 32-bit Services	Standard BIOS 32-bit Service Directory Proposal v0.4
PCI 3.0 Support	Full BIOS support for PCI Express through industry standard interfaces.
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0.
BBS	BIOS Boot Specification v1.01.
WMI Support	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications.
BIOS Boot Spec 1.01+	Provides more control over how and from what devices the workstation will boot.
BIOS Power On	Users can define a specific date and time for the system to power on.
ROM Based Computer Setup Utility (F10)	Review and customize system configuration settings controlled by the BIOS.
System/Emergency ROM Flash Recovery with Video	Recovers system BIOS in corrupted Flash ROM.
Replicated Setup	Saves BIOS settings to diskette or USB flash device in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Setup).
SMBIOS	System Management BIOS 2.6, for system management information.
Boot Control	Disables the ability to boot from removable media on supported devices.
Memory Change Alert	Alerts management console if memory is removed or changed.
Thermal Alert	Monitors the temperature state within the chassis. Three modes: • NORMAL - normal temperature ranges • ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown

	• SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console.
ACPI (Advanced Configuration and Power Management Interface)	• Allows the system to enter and resume from low power modes (sleep states). • Enables an operating system to control system power consumption based on the dynamic workload. • Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system. • Supports ACPI 2.0 for full compatibility with 64-bit operating systems.
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
Remote Wakeup/Remote Shutdown	System administrators can power on, restart, and power off a client computer from a remote location.
Instantly Available PC (Suspend to RAM - ACPI sleep state S3)	Allows for very low power consumption with quick resume time.
Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating system.
ROM revision levels	Reports the system BIOS revision level in Computer Configuration Utility (F10 Setup). Version is available through an industry standard interface (SMBIOS) so that management SW applications can use and report this information.
System board revision level	• Allows management SW to read the revision level of the system board • Revision level is digitally encoded into the HW and cannot be modified.
Start-up Diagnostics (Power-on Self-Test)	Assesses system health at boot time with selectable levels of testing.
Auto Setup when new hardware installed	System automatically detects addition of new hardware.
Keyboard-less Operation	The system can be booted without a keyboard.
Localized ROM Setup	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 12 languages with local keyboard mappings.
Asset Tag	The user or MIS to set a unique tag string in non-volatile memory.
Per-slot Control	Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually.
Adaptive Cooling	Control parameters are set according to detected hardware configuration for optimal acoustics.
Pre-boot Diagnostics	(Pre-video) critical errors are reported via beeps and blinks on the power LED.
Industry Standard Specification Support	
Industry Standard	Revision Supported by the BIOS
ACPI	Advanced Configuration and Power Management Interface, Version 2.0c
ASF	Alert Standard Format Specification, Version 2.0
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
CD Boot	"El Torito" Bootable CD-ROM Format Specification Version 1.0
EDD	• Enhanced Disk Drive Specification Version 1.1 • BIOS Enhanced Disk Drive Specification Version 3.0
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0

PCI	• PCI Local Bus Specification, Revision 2.3 • PCI Power Management Specification, Revision 1.1 • PCI Firmware Specification, Revision 3.0, Draft .7
PCI Express	PCI Express Base Specification, Revision 2.0
PMM	POST Memory Manager Specification, Version 1.01
SATA	• Serial ATA Specification, Revision 1.0a • Serial ATA 3 Gb/s: Extensions to Serial ATA 1.5Gb/s, Revision 1.0
SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Computing Group TPM Specification Version 1.2
UHCI	Universal Host Controller Interface Design Guide, Revision 1.1
USB	Universal Serial Bus Revision 1.1 Specification
USB 2.0	Universal Serial Bus Revision 2.0 Specification USB 3.0 Universal Serial Bus Revision 3.0 Specification
SMBIOS	System Management BIOS Reference Specification, Version 2.6

Social and Environmental Responsibility	
Eco-Label Certifications & Declarations	This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks: • ENERGY STAR® (energy-saving features available on selected configurations -Windows only) • US Federal Energy Management Program (FEMP) • EPEAT Gold® for all ENERGY STAR® configurations. For more details and a list of countries in which this product is registered, please visit the following link: http://www.epeat.net/ProductDisplay.aspx?return=search&action=view&search=true&productid=2478&ProductType=5&epeatcountryid=1 • China Energy Conservation Program • IT ECO declaration • Japan PC Green label* *This product conforms to the examination standards (2003 version) under JEITA's 'PC Green Label System.'
Batteries	This product complies with ISO standards: • EU Directive 91/ 157/ EEC • EU Directive 93/ 86/ EEC • EU Directive 98/ 101/ EEC Batteries used in the product do not contain: • Mercury greater than 5ppm by weight • Cadmium greater than 10ppm by weight • Lead greater than 40ppm by weight Battery size: CR2032 (coin cell) Battery type: Lithium
Restricted Material Usage	This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at

	http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html): • Asbestos • Batteries - Mercury • Batteries - Cadmium • Batteries - Lead (non-rechargeable) • Batteries - Non-rechargeable Alkaline and Carbon-Zinc Batteries • Batteries - Classification as "Not Restricted" for Transport • Brominated Flame Retardants (PBBs, PBDEs, including DecaBDE) • Brominated Flame Retardants (all BFRs in external case plastic parts) • Cadmium and its compounds • Certain Azo Colorants • Chlorinated Hydrocarbons • Chlorinated Paraffins • Formaldehyde • Formaldehyde - emissions • Hexavalent Chromium and its compounds in metallic applications • Hexavalent Chromium and its compounds in non-metallic applications • Lead and its compounds • Lead in paint • Lead in Polyvinyl Chloride (PVC) coating of external cables, wires and cords • Mercury and its compounds • Nickel on external surfaces • Ozone Depleting Substances (ODS) • Polycyclic Aromatic Hydrocarbons (PAH) • Perfluorooctane sulfonates (PFOS) in parts • Perfluorooctane sulfonates (PFOS) in preparations • Polychlorinated Biphenyls (PCBs) and Polychlorinated Terphenyls (PCTs) • Polychlorinated Naphthalenes • Polyvinyl Chloride (PVC) in external case plastic parts • Radioactive Substances • Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
Packaging	HP follows these guidelines to decrease the environmental impact of product packaging: • Eliminate the use of heavy metals such as lead, chromium, mercury, and cadmium in packaging materials. • Eliminate the use of ozone-depleting substances (ODS) in packaging materials. • Design packaging materials for ease of disassembly. • Maximize the use of post-consumer recycled content materials in packaging materials. • Use readily recyclable packaging materials such as paper and corrugated materials. • Reduce size and weight of packages to improve transportation fuel efficiency. • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.
Packaging Materials	
Internal	LDPE Foam: .366 kg
External	Cardboard carton and insert: 1.536 kg
End-of-Life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

System Technical Specifications

Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report: http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications: http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html
Service, Support and Warranty	On-site Warranty and Service (Note 1): One and three-years, limited warranty and service offering delivers on-site, next business-day (Note 2) service for parts and labour and includes free telephone support (Note 3) 8am - 5pm. Global coverage (Note 2) ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country. NOTE 3: Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries. HP Care Pack Services extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at http://www.hp.com/go/lookuptool. Additional HP Care Pack Services information by product is available at http://www.hp.com/hps/carepack. Service levels and response times for HP Care Packs may vary depending on your geographic location
Additional Information	• This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC. • This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986). • This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC. • Plastic parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043. • This product contains 0% recycled materials (by weight) • This product is >90% recycle-able when properly disposed of at end of life.

Manageability	
HP Client Management Solutions	Visit: http://www.hp.com/go/easydeploy
Product Change	• Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by email to customers, based on a user-defined profile. • PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition. • Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support.
Support Software CD & WWW	Yes
HP Client Manager	Visit: http://www.hp.com/go/easydeploy
System Software Manager	Visit: http://www.hp.com/go/ssm

As part of its commitment to hardware, software, and solution innovation, HP is proud to introduce this breakthrough platform configuration stability to HP Workstation customers. HP Stable & Consistent Offerings are built on the foundation of a carefully chosen set of hardware and software designed and tested to work with all HP Z Workstation platforms through their end of life. These components and their corresponding HP Workstation platform compatibility are outlined in this section.
HP Stable & Consistent Offerings are available worldwide to all HP Workstation customers-no special programs, no additional cost-no kidding. Simply select your hardware and software components when you customize your HP Workstation and be assured that you'll be able to buy that same configuration throughout the lifecycle of the product.

Processors	Product #	Offering
	NF136AV	Intel Xeon W3520, 2.66GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo
	VU898AV	Intel Xeon W3565, 3.20GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo
	WH058AV	Intel Xeon W3680, 3.33GHz, 12MB cache, 1333 memory, 6.4GT/s QPI, Six-Core, HT, Turbo

Hard Drives	Product #	Offering
	FX638AV	HP 250GB SATA 7200 1st HDD
	FX648AV	HP 250GB SATA 7200 2nd HDD
	FX658AV	HP 250GB SATA 7200 3rd HDD
	FX640AV	HP 500GB SATA 7200 1st HDD
	FX650AV	HP 500GB SATA 7200 2nd HDD
	FX660AV	HP 500GB SATA 7200 3rd HDD
	XB107AV	HP 500GB SATA 7200 4th HDD

Graphics	Product #	Offering
	FZ347AV	NVIDIA Quadro NVS 295 256MB Graphics Card
	FZ356AV	NVIDIA Quadro NVS 295 256MB Graphics (2nd)
	WS070AV	NVIDIA Quadro 2000 1GB Graphics
	WS071AV	NVIDIA Quadro 2000 1GB Graphics (2nd)

Memory	Product #	Offering
	NL980AV	3GB (3x1GB) DDR3-1333 ECC Unbuffered RAM
	NL982AV	6GB (3x2GB) DDR3-1333 ECC Unbuffered RAM
	NL984AV	12GB (3x4GB) DDR3-1333 ECC Unbuffered RAM

Optical and Removable Storage	Product #	Offering
	FX681AV	HP 16X DVD+-RW SuperMulti SATA 1st Drive
	FX682AV	HP 16X DVD+-RW SuperMulti SATA 2nd Drive

Stable & Consistent Offerings

Input Devices	Product #	Offering
	FX677AV	HP USB Optical Scroll Mouse
	FZ362AV	HP USB Standard Keyboard

Operating Systems	Product #	Offering
	VM432AV	Genuine Windows® 7 Professional 64-bit

Processors	Intel Xeon W3503, 2.40GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core
	Intel Xeon W3505, 2.53GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core
	Intel Xeon W3520, 2.66GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo
	Intel Xeon W3550, 3.06GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo
	Intel Xeon W3565, 3.20GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo
	Intel Xeon W3670, 3.20GHz, 12MB cache, 1066 memory, 4.8GT/s QPI, Six-Core, HT, Turbo
	Intel Xeon W3680, 3.33GHz, 12MB cache, 1333 memory, 6.4GT/s QPI, Six-Core, HT, Turbo
	Intel Xeon W3690, 3.46GHz, 12MB cache, 1333 memory, 6.4GT/s QPI, Six-Core, HT, Turbo

Introduction

Intel's latest-generation microarchitecture represents the next step in unprecedented processor performance and dynamic scalability. Designed from the ground up, Intel® Microarchitecture unleashes parallel processing performance technology providing an integrated memory controller and high-speed interconnect per independent processing core.

Performance and Features

Maximum multitasking performance Intel® Microarchitecture offers the latest in processor innovation, including:

- Dynamic scalability, managed cores, threads, cache, interfaces, and power for energy-efficient performance on demand
- Design and performance scalability for servers, workstations, notebooks and desktops with support for 2-8+ cores and up to 16+ threads with Intel® Hyper-Threading Technology (Intel® HT Technology), and scalable cache sizes, system interconnects, and integrated memory controllers
- Intel® Turbo Boost Technology delivers additional performance automatically when needed by taking advantage of the processor's power and thermal headroom. This enables increased performance of both multi-threaded and single-threaded workloads.
- Intel Hyper-Threading Technology brings high-performance applications into mainstream computing with 1-16+ threads optimized for a new generation multi-core processor architecture.
- Scalable shared memory of Intel® QuickPath technology features memory distributed to each processor with integrated memory controllers and high-speed point-to-point interconnects to unleash the performance of future versions of next-generation Intel® multi-core processors.
- Multi-level shared cache improves performance and efficiency by reducing latency to frequently used data.

Turbo Boost Technology

This technology, now built into Xeon 3500 Series Quad-Core and Xeon 3600 6-Core processors, will increase the speed of your processor on demand if the CPU is operating below power or thermal specifications:

- Benefit of Turbo Boost (how much the CPU speeds up) depends on number of active cores
- Likelihood of Turbo Boost operation increases when less cores are active and when dynamic power management is enabled

HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations	600GB SAS 15K rpm 6Gb/s 3.5" HDD	Capacity	600GB	
		Height	1 in; 2.54 cm	
		Width	Media Diameter	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	SAS	
		Synchronous Transfer Rate (Maximum)	6.0 Gb/s	
		Buffer	16 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.2 ms
			Average	3.4 ms
			Full Stroke	6.6 ms
		Rotational Speed	15,000 rpm	
		Logical Blocks	1,172,123,568 - 512 byte blocks	
		Operating Temperature	50° to 95° F (10° to 35° C)	
	450GB SAS 15K rpm 6Gb/s 3.5" HDD	Capacity	450GB	
		Height	1 in; 2.54 cm	
		Width	Media Diameter	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	SAS	
		Synchronous Transfer Rate (Maximum)	6Gb/s	
		Buffer	16MB	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.2 ms
			Average	3.4 ms
			Full Stroke	6.6 ms
		Rotational Speed	15,000 rpm	
		Operating Temperature	50° to 95° F (10° to 35° C)	
	300GB SAS 15K rpm 6Gb/s 3.5" HDD	Capacity	300GB	
		Height	1 in; 2.54 cm	
		Width	Media Diameter	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	SAS	
		Synchronous Transfer Rate (Maximum)	6Gb/s	
		Buffer	16MB	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.2 ms
			Average	3.4 ms
			Full Stroke	6.6 ms

		Rotational Speed	15,000 rpm	
		Operating Temperature	50° to 95° F (10° to 35° C)	
SATA (Serial ATA) Hard Drives for HP Workstations	600GB SATA 10K rpm SFF in 3.5" Frame HDD	Capacity	600GB	
		Height	1 in; 2.54 cm	
		Width	Media Diameter	2.5 in; 6.36 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (3.0Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 300MB/s	
		Buffer	32MB	
		Cache	Segmentable	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.4 ms (max)
			Average	3.6 ms
			Full Stroke	9.0 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	1,172,123,568	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	300GB SATA 10K rpm SFF in 3.5" Frame HDD	Capacity	300,069,052,416 bytes	
		Height	1 in; 2.54 cm	
		Width	Media Diameter	2.5 in; 6.36 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
		Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
		Cache	16 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.7 ms (maximum)
			Average	4.4 ms
			Full Stroke	9.5 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	586,072,368	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	160GB SATA 10K rpm SFF in 3.5" Frame HDD	Capacity	160,041,885,696 bytes	
		Height	1 in; 2.5 cm	
		Width	Media Diameter	2.5 in; 6.36 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (1.5 Gb/s), Native Command Queuing enabled	

	Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
	Buffer	16 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7 ms (maximum)
		Average	4.4 ms
		Full Stroke	9.5 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	41° to 131° F (5° to 55° C)	
2.0TB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	2.0TB	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing Enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300MB/s	
	Buffer	64MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.0 ms
		Average	10 ms
		Full Stroke	Not Specified
	Rotational Speed	7,200 rpm	
	Logical Blocks	3,907,029,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
1.5TB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	1.5TB	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300MB/s	
	Buffer	32MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	2,930,277,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	

1TB SATA 7200 rpm 3.0Gb/s 3.5" HDD	Capacity	1,000,204,886,016 bytes	
	Height	1 in; 2.5 cm	
	Width	Media Diameter	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
	Buffer	32 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	1,953,525,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
500GB SATA 7200 rpm 3Gb/s 3.5" HDD	Capacity	500,107,862,016 bytes	
	Height	1 in; 2.5 cm	
	Width	Media Diameter	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/s	
	Buffer	16 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
320GB SATA 7200 rpm 3Gb/s 3.5" HDD	Capacity	320,072,933,376 bytes	
	Height	0.98 in; 2.5 cm	
	Width	Media Diameter	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/s	
	Buffer	8 MB	

	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	12 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	625,142,448	
	Operating Temperature	41° to 131° F (5° to 55° C)	
250GB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	250,059,350,016 bytes	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	488,397,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
160GB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	160,041,885,696 bytes	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.2 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications - Hard Drives

HP Solid State Drives for Workstations	HP 160GB SATA SSD	Capacity	160GB	
		Width	Media Diameter	NaN in; NaN cm
			Physical Size	2.5 in; 6.36 cm
		Interface	SATA	
		Synchronous Transfer Rate (Maximum)	3Gb/s	
		Operating Temperature	32° to 158° F (0° to 70° C)	
	HP 160GB SATA X25-M SSD	Capacity	160,041,885,696 bytes	
		Height	0.28 in; 0.7 cm	
		Width	Media Diameter	NaN in; N/A cm
			Physical Size	2.5 in; 6.36 cm
		Interface	SATA	
		Synchronous Transfer Rate (Maximum)	3Gb/s	
		Seek Time (typical reads, includes controller overhead, including settling)	Average	Read: 75 microseconds; Write: 85 microseconds
		Logical Blocks	312,581,808	
		Operating Temperature	32° to 158° F (0° to 70° C)	

LSI 9212 4-Port SAS 6Gb/s RAID Card	PCI Bus	8-lane, 5GT/s PCI Express 2.0	
	PCI Modes	Bus Master DMA	
	RAID Levels	RAID 0, 1, 1E and 10	
	PCI Data Burst Transfer Rate	Half Duplex, x4 PCIe 2000 MB/s Full Duplex, x8 PCIe 4000 MB/s	
	SAS Bandwidth	Half Duplex	Single lane - 600 MB/s Wide Port (2 lanes) - 1200 MB/s Wide Port (4 lanes) - 2400 MB/s
		Full Duplex	Single SAS Lane - 1200 MB/s Wide Port (2 lanes) -2400 MB/s Wide Port (4 lanes) - 4800 MB/s
	PCI Card Type	3.3V Add-in card	
	PCI Voltage	12 V ± 10%	
	PCI Power	13.5 Watts	
	Bracket	Full height and Low-profile	
	Certification Level	PCI-Express 2.0	
	IO Bus	1x4 6Gb/s SAS ports	
	SAS Processor	LSISAS2008	
	Internal Connectors	Four x1 SATA	
	External Connectors	None	
	Maximum Number of SCSI Devices	256	
	LED Indicators	Internal Activity/Fault per x4 port - Heartbeat	

LSI MegaRAID® SAS 8888ELP Host Bus Adapter (HBA)	PCI Bus	PCI-Express x8 lanes
	PCI Modes	Bus Master DMA
	RAID Levels	RAID 0, 1, and 5 RAID spans 10 and 50
	PCI Data Burst Transfer Rate	Up to 3Gb/s per port
	Full Duplex	Up to 1.5 GB/s
	PCI Voltage	+3.3V Add-in Card
	PCI Power	19.2 Watts Maximum
	Certification Level	PCI-Express 1.0a
	IO Bus	Eight 3Gb/s SAS/SATA ports
	Internal Connectors	Two SAS SFF8087 x4
	External Connectors	Two SAS SFF8088 x4
	Maximum Number of SCSI DeviceS	32
	LED Indicators	Connector LEDs indicate whether the internal or external connector is active for ports 0-3 and 4-7

LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card and iBBU08 Battery Backup Unit	PCI Bus	PCI-Express (Gen2) V2.0 x8 lanes
	PCI Modes	Bus Master DMA
	RAID Levels	RAID 0, 1, 5, and 6 RAID spans 10, 50 and 60
	PCI Data Burst Transfer Rate	Up to 4GB/s
	PCI Card Type	Low profile, single PCIe slot design with full height bracket. The optional iBBU08 Battery Backup unit mounts on the controller card and the assembly remains within a single PCIe slot width.
	PCI Voltage	+3.3V Add-in Card
	PCI Power	12.5 Watts
	Certification Level	PCI-Express 2.0
	IO Bus	Eight 3 Gb/s and 6Gb/s compatible SAS/SATA ports
	Internal Connectors	Two SAS SFF8087 x4
	External Connectors	None
	Maximum Number of SCSI Devices	32. NOTE: HP Workstations do not support this many internal drives.
	LED Indicators	Connector LEDs indicate whether the internal connector is active for ports 0-3 and 4-7

Technical Specifications - Graphics

NVIDIA Quadro NVS 295 256MB Graphics Card	Form Factor	2.731 inches (H) × 6.600 inches (L), Half-Height
	Graphics Controller	NVIDIA Quadro NVS 295 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	256 MB GDDR3 SDRAM unified graphics memory
	Connectors	2 DisplayPort Comes with 2 DisplayPort to DVI-D Adapters ('DisplayPort to VGA' and 'DisplayPort to DL DVI' adapters available as an accessory)
	Maximum Resolution	Two DisplayPort outputs drive two digital displays up to 2560 x 1600 NOTE: This card supports up to two displays
	Display Output	• Drives DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking • Drives DVI enabled digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking (through DisplayPort to DVI-D (single link) cable)
	Supported Graphics APIs	OpenGL 3.0 DirectX 10.0
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation (64-bit and 32-bit) SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	<24 Watts

Technical Specifications - Graphics

NVIDIA NVS 300 512MB Graphics Card	Form Factor	2.7 inches (H) x 5.7 inches (L), Half-Height
	Graphics Controller	NVIDIA NVS 300 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	512 MB GDDR3 SDRAM unified graphics memory
	Connectors	DMS-59 Includes DMS-59 to Dual DVI-I adapter DMS-59 to Dual DisplayPort adapter and DMS-59 to Dual VGA adapter available as an option DMS-59 to Dual DisplayPort adapter required for HP ZR30w Display
	Maximum Resolution	DVI: two digital displays up to 1920 x 1200 DisplayPort: two digital displays up to 2560 x 1600 VGA: two analog displays up to 1920 x 1080
	Image Quality Features	
	Display Output	This card support up to two displays: • Drives DVI enabled digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking • Drives DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking (through optional DMS-59 to DisplayPort adapter) • Drives VGA enabled analog displays at resolutions up to 1920 x 1080 (through optional DMS-59 to VGA adapter)
	Supported Graphics APIs	OGL 3.3 DirectX 10.1
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	<18 Watts

Technical Specifications - Graphics

AMD FirePro 2270 512MB Graphics Card	Form Factor	Low Profile, Half Length, 2.3" x 6.6"
	Graphics Controller	AMD FirePro™ 2270 Professional Graphics
	Bus Type	PCI Express™ x16 Generation 2.0
	Memory	512MB DDR3
	Connectors	DMS-59 connector to support breakout cables for dual DisplayPort, DVI and VGA output. DMS-59 to Dual DVI adapter included. (Display Port and VGA adapters sold separately)
	Maximum Resolution	Digital 2560x1600 (DisplayPort) Analog 1920x1200 (DVI 60 Hz/ VGA 75Hz)
	RAMDAC	400 MHz DAC, 10-bit per channel
	Display Output	Card supports up to two displays
	Supported Graphics APIs	DirectX 11 and OpenGL 4.0
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	17W Maximum
NVIDIA Quadro NVS 450 512 MB PCIe Graphics Card	Form Factor	ATX Full Height, 1/2 length Passive cooling
	Bus Type	PCI Express x16, Generation 2.0
	Memory	512 MB GDDR3 (256MB per GPU)
	Connectors	Four DisplayPort; Four DisplayPort to DVI-D adapters included. ('DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory)
	Maximum Resolution	DisplayPort connectors support ultra-high-resolution panels (up to 2560 x 1600) NOTE: This card supports up to four displays
	Supported Graphics APIs	OpenGL 3.0 DirectX 10.0
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Microsoft Windows Vista (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

		Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	<40 Watts
NVIDIA Quadro FX 380 256MB Graphics Card	Form Factor	4.376 inches (H) × 6.60 inches (L)
	Graphics Controller	NVIDIA Quadro FX 380 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	256 MB GDDR3 SDRAM unified graphics memory
	Connectors	2 Dual-Link DVI-I Two DVI to VGA adapters included
	Maximum Resolution	Two dual-link DVI-I outputs drive two digital displays at resolutions up to 2560 x 1600 @ 60Hz or two analog displays at resolutions up to 2048 x 1536 @ 85Hz NOTE: This card supports up to two displays
	RAMDAC	Dual Internal 400 MHz DAC
	Shading architecture	Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) • Long fragment programs (unlimited instructions) • Long vertex programs (unlimited instructions) • Looping and subroutines (up to 256 loops per vertex program) • Dynamic flow control • Conditional execution
	Supported graphics APIs	OpenGL 3.0 DirectX 10.0
	Available graphics drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power consumption	34 Watts

Technical Specifications - Graphics

NVIDIA Quadro 400 512MB Graphics Card	Form Factor	Low Profile, 2.7 inches (H) x 5.6 inches (L)
	Graphics Controller	NVIDIA Quadro 400 Graphics Board
	Bus Type	PCI Express x 16, Generation 2.0
	Memory	512MB DDR3 SDRAM
	Connectors	One (1) Dual-link DVI-I One (1) DisplayPort 1.1 Includes one DisplayPort to Dual DVI-D adapter
	Maximum Resolution	DisplayPort 1.1: 2560 x 1600 @ 60 Hz Dual Link DVI-I: 2560 x 1600 @ 60 Hz Analog: 2048 x1536 @ 85 Hz
	RAMDAC	Dual internal 400 MHz DACs
	Display Output	This card supports up to two displays
	Supported Graphics APIs	OpenGL 3.2 DirectX 10.1 Shader Model 4.1
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	< 35 Watts
NVIDIA Quadro 600 1GB Graphics Card	Form Factor	2.731" H x 6.6" L Single Slot Small Form Factor
	Graphics Controller	NVIDIA Quadro 600 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	1 GB GDDR3 128-bit
	Connectors	1 DVI-I output, 1DisplayPort output One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories
	Maximum Resolution	DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	Shading Architecture	Shader Model 5.0

Technical Specifications - Graphics

	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 and Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	40 Watts
ATI FirePro V3800 512MB Graphics Card	Form Factor	2.71 in (H) x 6.61 in (L) "Single-Wide"
	Graphics Controller	ATI FirePro V3800 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	512 MB DDR3 SDRAM
	Connectors	1 DL DVI, 1 DP output One DP to DVI adapter included
	Maximum Resolution	Up to two digital displays at resolutions up to 2560 x 1600 @ 60Hz or two analog displays, one at resolutions up to 2048 x 1536 @ 85Hz, the other at up to 1920 x 1200 @ 60Hz (165 MHz dot clock) NOTES: This card supports up to two displays Use of more than two displays on Linux requires support for xrandr 1.2 or greater in the X server
	RAMDAC	400 MHz DAC, 10-bits per channel
	Image Quality Features	• Full 30-bit display pipeline for more accurate colour reproduction superior image quality (30-bit monitor required for full 30-bit display) • Advanced video capabilities, including high fidelity gamma, colour correction and scaling • Dedicated hardware (UVD2) for H.264, VC-1, and MPEG2 decode
	Shading architecture	• Support for Full Shader Model 5.0 • 400 Stream Processing Units • Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders • Common instruction set and texture unit access supported for all types of shaders • Dedicated branch execution units and texture address processors • Anti-aliases Shaders and Textures as well as Polygon Edges

Technical Specifications - Graphics

	Supported graphics APIs	DirectX 11, OpenGL 3.2, OpenCL 1.0 and full implementation of DirectCompute 11 (OpenCL™ compliant driver and SDK release scheduled in 2010)
	Available graphics drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) WS4 * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	43 Watts
ATI FirePro V4800 1GB Graphics Card	Form Factor	4.37 in (H) x 6.61 in (L)
	Graphics Controller	ATI FirePro V4800 Graphics Card
	Bus Type	PCI Express x 16, Generation 2.0
	Memory	1GB GDDR5 SDRAM
	Connectors	2 DisplayPort, 1 dual link DVI Output One DP to DVI adapter included
	Maximum Resolution	Up to three digital displays at resolutions up to 2560 x 1600 @ 60Hz or up to three analog displays, one at resolutions up to 2048 x 1536 @ 85Hz, plus two resolutions up to 1920 x 1200 @ 60Hz (165 MHz dot clock) NOTE: This card supports up to three displays with Windows 7, Vista or Linux, and up to two displays on XP
	RAMDAC	400 MHz DAC, 10-bit per channel
	Image Quality Features	• Up to 3 independent outputs with ATI Eyefinity technology support (More information at: www.amd.com/us/products/technologies/eyefinity/) • Full 30-bit display pipeline for more accurate colour reproduction superior image quality2 • Advanced video capabilities, including high fidelity gamma, colour correction and scaling • Dedicated hardware (UVD2) for H.264, VC-1, and MPEG2 decode NOTE: The use of more than two displays on Linux requires support for xrandr 1.2 or greater in the X server
	Shading architecture	• Support for Full Shader Model 5.0 • Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders • Common instruction set and texture unit access supported for all types of shaders • Dedicated branch execution units and texture address processors • Anti-aliases Shaders and Textures as well as Polygon Edges

Technical Specifications - Graphics

	Supported graphics APIs	DirectX 11, OpenGL 3.2, OpenCL 1.03 and full implementation of DirectCompute 11 (OpenCL™ compliant driver and SDK release scheduled in 2010)
	Available graphics drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	69 Watts
NVIDIA Quadro 2000 1GB Graphics Card	Form Factor	4.376" H x 7" L Single Slot
	Graphics Controller	NVIDIA Quadro 2000 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	1 GB GDDR5 128-bit
	Connectors	1 DVI-I output, 2 DisplayPort outputs One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories
	Maximum Resolution	Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	Image Quality Features	• Up to 16K x16K texture and render processing • Transparent multisampling and super sampling • 16x angle independent anisotropic filtering • 128-bit floating point performance • 32-bit per-component floating point texture filtering and blending • Support for any combination of two connected displays • DisplayPort 1.1a, HDMI 1.3a, and HDCP support • NVIDIA® 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support • Full OpenGL quad buffered stereo support • Underscan/overscan compensation and hardware scaling • NVIDIA® nView® multi-display technology
	Shading Architecture	Shader Model 5.0

Technical Specifications - Graphics

	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 and Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	62 Watts
ATI FirePro V5800 1GB Graphics Card	Form Factor	4.38 in (H) x 9.0 in (L)
	Graphics Controller	ATI FirePro V5800 Graphics Card
	Bus Type	PCI Express x 16, Generation 2.0
	Memory	1GB GDDR5 SDRAM
	Connectors	2 DP, 1 DL DVI One DP to DVI adapter included
	Maximum Resolution	Up to three digital displays at resolutions up to 2560 x 1600 @ 60Hz or up to three analog displays, one resolution up to 2048 x 1536 @ 85Hz, plus two display resolutions up to 1920 x 1200 @ 60 Hz (165 MHz dot clock) NOTES: This card supports up to three displays with Vista, Win7, or Linux, up to two displays with XP The use of more than two displays on Linux requires support for xrandr 1.2 or greater in the X server
	RAMDAC	400 MHz DAC, 10-bits per channel
	Image Quality Features	• 3 independent outputs with ATI Eyefinity1 technology support (More information at: www.amd.com/us/products/technologies/eyefinity/) • Full 30-bit display pipeline for more accurate colour reproduction superior image quality2 • Advanced video capabilities, including high fidelity gamma, colour correction and scaling • Dedicated hardware (UVD2) for H.264, VC-1, and MPEG2 decode
	Shading architecture	• Support for Full Shader Model 5.0 • Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders

		• Common instruction set and texture unit access supported for all types of shaders • Dedicated branch execution units and texture address processors • Anti-aliases Shaders and Textures as well as Polygon Edges
	Supported graphics APIs	DirectX 11, OpenGL 3.2, OpenCL 1.0 and full implementation of DirectCompute 11 (OpenCL™ compliant driver and SDK release scheduled in 2010)
	Available graphics drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	75 Watts
AMD FirePro V5900 2GB Graphics Card	Form Factor	Full-height, full length, single slot
	Graphics Controller	AMD FirePro™ V5900 Professional Graphics
	Bus Type	PCI Express™ x16, Generation 2.1
	Memory	2GB GDDR5
	Connectors	2 x Display Port 1.2 1 x Dual-link DVI
	Maximum Resolution	2560 x 1600
	Display Output	DirectX 11 and OpenGL 4.1
	Supported Graphics APIs	DirectX 11 and OpenGL 4.1
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Linux® (32-bit or 64-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	< 75W
	Note	Monitors should be same model when using DP-DVI connections to use the Eyefinity feature. There are no additional limitations when using DisplayPort cables.

Technical Specifications - Graphics

NVIDIA Quadro FX 4800 1.5GB PCIe Graphics Card	Form Factor	4.36" (H) x 10.5" (L) Dual slot card
	Graphics Controller	NVIDIA Quadro FX 4800 graphics board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	1.5 GB GDDR3 SDRAM unified graphics memory
	Connectors	2 DisplayPort, 1 Dual-Link DVI-I, 1 3-pin Mini DIN stereo output, One DisplayPort to DVI-D adapter included ('DVI to VGA', 'DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory)
	Maximum Resolution	• 2 DisplayPort connectors support ultra-high-resolution panels (up to 2560 x 1600) • Dual-link DVI-I output drives one digital display at resolutions up to 2560 x 1600 @ 60Hz • Internal 400 MHz DACs-One analog display up to 2048 x 1536 @ 85Hz NOTE: This card supports up to two displays.
	Shading Architecture	• Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) • Long fragment programs (unlimited instructions) • Long vertex programs (unlimited instructions) • Looping and subroutines (up to 256 loops per vertex program) • Dynamic flow control • Conditional execution
	Supported Graphics APIs	OpenGL 3.0 DirectX 10.0
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation Red Hat Enterprise Linux (RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power consumption	146 Watts
NVIDIA Quadro 4000 2GB Graphics Card	Form Factor	4.376" H x 9.50" L Single Slot
	Graphics Controller	NVIDIA Quadro 4000 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	2 GB GDDR5 256-bit

Technical Specifications - Graphics

Connectors	1 DVI-I output, 2 DisplayPort outputs; One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to DVI (single- link or dual-link) adapters available as accessories (Optional stereo bracket available from 3rd party)
Maximum Resolution	Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
RAMDAC	400 MHz integrated RAMDAC
Image Quality Features	• Up to 16K x16K texture and render processing • Transparent multisampling and super sampling • 16x angle independent anisotropic filtering • 128-bit floating point performance • 32-bit per-component floating point texture filtering and blending • Support for any combination of two connected displays • DisplayPort 1.1a, HDMI 1.3a, and HDCP support • NVIDIA 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support • Full OpenGL quad buffered stereo support • Underscan/overscan compensation and hardware scaling • NVIDIA nView® multi-display technology
Shading Architecture	Shader Model 5.0
Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 and Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
Power Consumption	142 Watts

Technical Specifications - Graphics

NVIDIA Quadro 5000 2.5GB Graphics Card	Form Factor	4.376" H x 9.75" L Dual Slot
	Graphics Controller	NVIDIA Quadro 5000 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	2.5 GB GDDR5 320-bit
	Connectors	DVI-I (1), DP (2), Stereo (1) One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories
	Maximum Resolution	Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	Image Quality Features	• Up to 16K x16K texture and render processing • Transparent multisampling and super sampling • 16x angle independent anisotropic filtering • 128-bit floating point performance • 32-bit per-component floating point texture filtering and blending • Support for any combination of two connected displays • DisplayPort 1.1a, HDMI 1.3a, and HDCP support • NVIDIA 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support • Full OpenGL quad buffered stereo support • Underscan/overscan compensation and hardware scaling • NVIDIA nView® multi-display technology
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 and Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	152 Watts

Technical Specifications - Graphics

AMD FirePro V7900 2GB Graphics Card	Form Factor	Full height, full length, single slot
	Graphics Controller	AMD FirePro™ V7900 Professional Graphics
	Bus Type	PCI Express™ x16, Generation 2.1
	Memory	2GB GDDR5
	Connectors	4 x DisplayPort 1.2
	Maximum Resolution	2560 x1600
	Supported Graphics APIs	DirectX 11 and OpenGL 4.1
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Linux® (32-bit or 64-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	< 150W
	Note	Monitors should be same model when using DP-DVI connections to use the Eyefinity feature. There are no additional limitations when using DisplayPort cables.

NVIDIA Tesla C2050 Compute Processor	Form Factor	4.376 inches by 9.75 inches Dual Slot
	System Interface	PCI Express Gen2 ×16
	Video Outputs	One Dual Link DVI-I (Consumer graphics level of performance)
	Memory	3GB GDDR5
	Peak Memory Bandwidth	+170 GB/s
	Supported APIs	CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Supported Operating Systems	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Processor Cores	448 CUDA cores
	Power Consumption	~225 Watts NOTE 1: An 1110W PSU is required for Tesla C2050 on the Z800 NOTE 2: A 600W PSU is required for Tesla C2050 on the Z400

Technical Specifications - Multimedia and Audio Devices

Integrated Intel/Realtek HD ALC262 Audio	Type	Integrated
	High Definition Codec	Yes
	FM Synthesis Support	Yes
	OPL3 FM Synthesis Support	Yes
	Sound Blaster Compatibility	Yes
	Meets Premium performance for Windows Logo Program 3.0	Yes
	Audio Jacks	Front panel microphone in and headphone out - fixed usage. Rear panel line in and line out jacks - jacks are retaskable One Line-In* (12-K ohm Input Impedance)* NOTE: External Speakers need to be powered externally.
	Sampling	3 stereo ADCs support 16/20-bit PCM format with 44.1K/48K/96kHz sample rate 2 stereo DAC supports 16/20/24-bit PCM format with 44.1K/48K/96K/192kHz sample rate
	Wavetable Syntheses (software)	Yes – GM and FM Midi Support, Direct Music and Down Loadable Soundset (4 Meg DLS Level 1 and 2 Support)
	3D Positional Sound	No
	Digital Audio	Yes
	Analog Audio	Yes
	DVD Audio	Yes
	Number of Channels on Line-Out	Stereo (Left & Right channels)
	Internal Audio Speaker Power Rating	1.5 W
	Internal Speaker	Yes
	Hardware Equalizer for Internal Speaker	No
	External Speaker Jack (Line-Out)	Yes

Technical Specifications - Multimedia and Audio Devices

HP Thin USB Powered Speakers	Frequency Response (-3dB, 24-bit/96kHz input)	FO to 20kHz
	Dimensions	Speakers: 14.52 x 9.50 x 2.45 cm (5.72 x 3.74 x 0.96 in) per speaker
	On/Off/Volume Controls	Right side of right speaker
	Power LED	Front of right speaker (green)
	Watts	2/3 watt (normal/maximum)
	Net weight	0.31kg (0.68 lbs)
	Environmental (all conditions non-condensing)	Temperature (operating): -10° to 40° C (14° to 104° F) Relative Humidity (operating): 40% to 90%
	Speaker cable length	Input cord: 1800mm±35mm (5.91 ft) L-channel cord: 1000mm±35mm (3.28 ft) USB cord: 1800mm±35mm (5.91 ft)
	Colour	HP Carbonite
	Kit Contents	One pair of HP Thin USB Powered Speakers with attached audio signal and USB power cables for connecting to your PC HP Warranty documentation
SoundBlaster (Creative Labs) X-Fi Titanium PCIe Audio Card	24-bit Analog-to-Digital conversion of analog inputs	96kHz sample rate
	24-bit Digital-to-Analog conversion of digital sources	96kHz to analog 7:1 speaker output
	24-bit Digital-to-Analog conversion of stereo digital sources	8, 11.025, 16, 22.05, 24, 32, 44.1, 48 and 96kHz
	16-bit to 24-bit recording sampling rates	16-bit/44.1kHz, 16-bit/48kHz, 24-bit/44.1kHz, 24-bit/48kHz and 24-bit/96kHz with direct monitoring
	Enhanced SoundFont support	Up to 24-bit resolution
	Signal-to-Noise Ratio (2okHz Low-pass filter, A-Weighted)	109dB
	Total Harmonic Distortion + Noise at 1kHz (20kHz Low-pass filter)	.004%
	Frequency Response (-3dB, 24-bit/96kHz input)	10Hz to 46kHz
	Frequency Response (-3dB, 24-bit/192kHz input)	10Hz to 46kHz
	Speaker and Headphone connections	Stereo to 7.1 (Line Out via three 3.5mm mini jacks)
	Flexijack	Line In/ Microphone In/Optical Out via shared 3.5mm mini jack
	Front Panel Header	Intel HD Audio Compatible (2x5 pin)

Operating System	Windows 7 Professional 32-bit and 64-bit Microsoft Windows Vista Business 32-bit and 64-bit Microsoft® Windows® XP Professional SP2 Microsoft Windows XP Professional x64 Edition	
Minimum System Requirements	System RAM	512MB
	Operating System	Windows Vista 32-bit and 64-bit version or Windows XP 32-bit or 64-bit version

NOTE 1: Actual speeds may vary. Does not permit copying of commercially available DVD movies or other copyright protected materials. Intended for creation and storage of your original material and other lawful uses. Double Layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players.

HP DVD-ROM Drive	Description		5.25-inch, half-height, tray-load
	Mounting Orientation		Either horizontal or vertical
	Interface Type		SATA/ATAPI
	Dimensions (WxHxD)		15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)
	Disc Capacity	DVD-ROM	Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB
	Access Times	DVD-ROM Single Layer	< 140 ms (typical)
		CD-ROM Mode 1	< 125 ms (typical)
		Full Stroke DVD	< 250 ms (seek)
		Full Stroke CD	< 210 ms (seek)
	Power	Source	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p
		DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC - < 600 mA typical, < 1400 mA maximum
	Operating Environmental (all conditions non-condensing)	Temperature	5° to 50° C (41° to 122° F)
		Relative Humidity	10% to 90%
		Maximum Wet Bulb Temperature	30° C (86° F)
		Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation Novell SLED 10 & SLED 11 No driver is required for this device. Native support is provided by the operating system. * Certain Windows Vista product features require advanced or additional hardware. See http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit:

http://www.windowsvista.com/systemrequirements.

** RHEL WS4 not supported on Z200/Z200SFF

HP DVD+/-RW Drive	Description	5.25-inch, half-height, tray-load		
	Mounting Orientation	Either horizontal or vertical		
	Interface Type	SATA/ATAPI		
	Dimensions (WxHxD)	15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)		
	Disc Formats	DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW		
	Disc Capacity	DVD-ROM	8.5 GB DL or 4.7 GB standard	
		Full Stroke DVD	< 250 ms (seek)	
		Full Stroke CD	< 210 ms (seek)	
	Maximum Data Transfer Rates	CD ROM Read	CD-ROM, CD-R Up to 40X CD-RW Up to 32X	
		DVD ROM Read	DVD-RAM	Up to 12X
			DVD+RW	Up to 8X
			DVD-RW	Up to 8X
			DVD+R DL	Up to 8X
			DVD-R DL	Up to 8X
			DVD-ROM	Up to 16X
			DVD-ROM DL	Up to 8X
			DVD+R	Up to 16X
			DVD-R	Up to 16X
	Power	Source	SATA DC power receptacle	
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p	
		DC Current	5 VDC -1000 mA typical, 1600 mA maximum 12 VDC -600 mA typical, 1400 mA maximum	
	Operating Environmental (all conditions non-condensing)	Temperature	5° to 50° C (41° to 122° F)	
		Relative Humidity	10% to 90%	
		Maximum Wet Bulb Temperature	30° C (86° F)	
		Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*.	

		Red Hat Enterprise Linux (RHEL) WS4**, 5, 6 Desktop/Workstation Novell SLED 10 & SLED 11 No driver is required for this device. Native support is provided by the operating system. *Certain Windows Vista product features require advanced or additional hardware. See http://microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements ** RHEL WS4 not supported on Z200/Z200SFF
	Kit Contents	HP SATA SuperMulti DVD Writer Drive, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide, and DVD+R media.

HP Blu-Ray Writer	**Description**	5.25-inch, half-height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA	
	Dimensions (WxHxD)	15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)	
	Disc Formats	BD-ROM BD-R BD-RE DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
	Disc Capacity	**DVD-ROM**	8.5 GB DL or 4.7 GB standard
		Blu-ray	50 GB DL or 25 GB standard
		Full Stroke DVD	< 250 ms (seek)
		Full Stroke CD	< 210 ms (seek)
		Blu-ray	Blu-ray
		Startup Time (Time to drive ready from tray	BD-ROM (SL/DL) 25S / 28S BD-R (SL/DL) 25S / 28S

	loading)	BD-RE (SL/DL)	25S / 28S
		DVD-ROM (SL/DL)	18S / 18S
		DVD-R (SL/DL)	25S / 25S
		DVD-RW	25S
		DVD+R (SL/DL)	25S / 25S
		DVD+RW	25S
		DVD-RAM	45S
		CD-ROM	45S
Maximum Data Transfer Rates	CD ROM Read	CD-ROM	Up to 40X
		CD-R	Up to 40X
		CD-RW	Up to 40X
	DVD ROM Read	DVD-RAM	Up to 5X
		DVD+RW	Up to 10X
		DVD-RW	Up to 10X
		DVD+R DL	Up to 8X
		DVD-R DL	Up to 8X
		DVD-ROM	Up to 16X
		DVD-ROM DL	Up to 8X
		DVD+R	Up to 12X
		DVD-R	Up to 12X
	Blu-Ray	BD-ROM	Up to 6X
		BD-ROM DL	Up to 4.8X
		BD-R	Up to 6X
		BD-R DL	Up to 4.8X
		BD-R	Up to 6X
		BD-RE SL/DL	Up to 4.8X
Power	Source	SATA DC power receptacle	
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 10%-100 mV ripple p-p	
	DC Current	5 VDC -900 mA typical, 1200 mA maximum 12 VDC -1000 mA typical, 1600 mA maximum	
Operating Environmental (all conditions non-condensing)	Temperature	5° to 50° C (41° to 122° F)	
	Relative Humidity	15% to 80%	
	Maximum Wet Bulb Temperature	30° C (86° F)	
	Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation Novell SLED 10 & SLED 11	

		* No driver is required for this device. Native support is provided by the operating system. ** RHEL WS4 not supported on Z200/Z200SFF
	Kit Contents	HP Blue Laser RW Drive, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide.
	Disclaimer	As Blu-Ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-Ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.
HP 22-in-1 Media Card Reader	Description	The Media Card Reader device uses the same physical form factor and mounting as a Floppy Disk Drive. The device connects to a 2x5 two-channel USB header on the motherboard of the system. There is no USB controller card provided. Please see the Disc Formats section below for a list of flash memory card formats that are supported.
	Mounting Orientation	The Media Card Reader can be mounted in a dedicated Floppy Drive bay (if the chassis provides one) or in an appropriate Optical Bay adapter. It will operate in any orientation.
	Interface Type	USB 2.0 (one channel dedicated to the separate USB port; one channel dedicated to the flash memory card slots)
	Dimensions (WxHxD)	124.5 x 101.6 x 25.4 mm (4.9 x 4.0 x 1.0 in)
	Disc Formats	xD-Picture Micro SD Micro SDHC SD SDHC SDXC Mini SD Mini SDHC MultiMediaCard (MMC) Reduced Size MultiMediaCard (RS MMC) MultiMedia Card 4.2 (MMC Plus, including MMC Plus HC) Reduced Size MultiMedia Card 4.2 (MMC Mobile, including MMC Mobile HC) CompactFlash Card Type I CompactFlash Card Type II MicroDrive Memory Stick (MS) MagicGate Memory Stick (MG) MagicGate Memory Stick Duo Memory Stick Select Memory Stick Duo (MS Duo) Memory Stick PRO (MS PRO) Memory Stick PRO Duo (MS PRO Duo) Memory Stick PRO-HG Duo

Two additional formats are usable with adapters (not supplied):
MMC Micro
Memory Stick Micro (M2)

Technical Specifications - Controller Cards

HP FireWire/IEEE 1394a PCI Card	Data Transfer Rate	Burst Data Rate up to 400 Mbps
	Device Interface Protocol	IEEE-1394a
	Devices Supported	IEEE-1394 compliant devices
	Bus Type	PCI card with brackets for low profile and full height PCI slots.
	Certification Level	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	Ports	Two IEEE 1394 6-Pin Connector (Rear)
	Internal Connectors	One 10-Pin (9 Contacts) Custom Connector
	System Requirements	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. No driver is required for this device. Native support is provided by the operating system. * Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements. Pentium II 266 or above 128-MB RAM 1-GB Hard Drive CD-ROM drive Built-in sound system Available PCI slot
	Temperature - Operating	50° to 131° F (10° to 55° C)
	Temperature - Storage	-22° to 140° F (-30° to 60° C)
	Relative Humidity - Operating	20% to 80%
	Operating Systems Supported	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32* * Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.

Technical Specifications - Controller Cards

HP IEEE 1394b FireWire PCIe Card	Data Transfer Rate	Supports up to 800 Mbps
	Devices Supported	IEEE-1394 compliant devices
	Bus Type	PCIe card full height PCIe slots
	Ports	Two IEEE-1394b bilingual 9-Pin Connector (Rear)
	Internal Connectors	One 10-Pin header Custom Connector
	System Requirements	Windows 7 Professional 32-bit and 64-bit, Microsoft® Windows® XP Professional, Windows XP Home, Windows Vista. Not supported on Linux. Pentium® III or higher processor 128-MB RAM 1-GB Hard Drive CD-ROM drive Built in sound system Available PCI slot
	Temperature – Operating	50° to 131° F (10° to 55° C)
	Temperature – Storage	–22° to 140° F (–30° to 60° C)
	Relative Humidity – Operating	20% to 80%
	Compliances	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista® Business 32-bit and 64-bit, Windows® XP Professional, XP Professional 64-bit. Not supported on Linux.

HP SuperSpeed USB 3.0 PCIe x1 Card	Dimensions (HxD)	Full-height: 4.13 x 2.32 in; Low profile: 2.68 x 2.32 in (Full-height: 104.89 x 59.04 mm; Low profile: 68.09 x 59.04 mm)
	Ports	2 External
	Operating Systems Supported	Microsoft Windows 7, Windows Vista*, Windows XP Professional (32-bit and 64-bit); Red Hat Enterprise Linux 6.0, SuSE Linux Enterprise Desktop 11 * Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.
	Kit Contents	I/O and Security Software and Documentation CD with software drivers and documentation, HP SuperSpeed USB 3.0 PCIe x1 card (with full-height expansion bracket attached), SATA to SATA split power extension cable, Low profile expansion bracket to replace the full-height expansion bracket required on some computer models and HP SuperSpeed USB 3.0 PCIe x1 Card Quick Setup.
	Regulatory Approvals and registrations	FCC 15B, CE EN55022+ EN55024, VCCI, CISPR 22 AS/NZS CISPR 22, LCIE CB service (ITE/AV) IEC 60950-1, Korea EMC, UL USB-IF
	Weight	0.21 lb (95.0 g)
	Warranty	The HP Super Speed USB 3.0 PCIe x1 Card has either a one-year limited warranty or the remainder of the warranty of the HP product in which it is installed. Technical support is available seven days a week, 24 hours a day, by phone, as well as online support forums. Certain restrictions and exclusions apply.

NOTE 1: "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

Integrated Broadcom 5764 PCIe LOM Controller	Connector	RJ45
	Data Rates Supported	10/100/1000BT
	Bus Architecture	PCIe X1
	Alerting	ASF 2.0

Broadcom (5761) NetXtreme Gigabit Ethernet Plus NIC	Connector	RJ-45
	Controller	Broadcom 5761 PCI-Express LAN Controller
	Memory	8 MB NVRAM serial Flash
	Data Rates Supported	10/100/1000 Mbps
	Compliance	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB, 802.3u, and 802.3x
	Bus Architecture	PCI-Express
	Data Path Width	Single Channel PCI-Express
	Data Transfer Mode	Bus Master DMA
	Hardware Certifications	FCC class B, Canada and US NRTL Mark, C-Tick for Australia, BSMI for Taiwan, VCCI for Japan, MIC for Korea, GOST for Russia, UL listed (E212044), European Union Notice (CE 0682)
	Power Requirement	1.8W @ 3.3V
	Boot ROM Support	Yes
	Network Transfer Mode	Full-duplex Half-duplex (not available for the 1000BASE-T transceiver)
	Network Transfer Rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
	Operating Temperature	32° to 131°F (0° to 55° C)
	Operating Humidity	131° F (55° C) with 5% to 95% non-condensing humidity
	Dimensions	7 cm x 10.5 cm (2.75 in x 4.13 in), low profile compatible
	Operating System Driver Support	Windows 7 Professional 32-bit and 64-bit, Windows Vista 32-bit SP1, Windows Vista x64 SP1, Windows XP 32 bit professional, Windows XP x64 Red Hat Enterprise Linux(RHEL) WS4*, 5, 6 Desktop/Workstation Novell SLED 10 & 11 *RHEL WS4 not supported on Z200/Z200SFF
	Management Capabilities	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Broadcom mgmt utility, ASF2.0, DASH 1.0 and DASH 1.1 profiles
	Kit Contents	Broadcom NetXtreme Gigabit Ethernet Plus NIC, Broadcom NetXtreme Gigabit Ethernet Plus NIC USB Cable Assembly, CD, drivers, quick install guide, product warranty statement

Technical Specifications - Networking and Communications

Intel Gigabit CT Desktop NIC	Connector	RJ-45
	Controller	Intel WG82574L Gigabit Ethernet Controller
	Memory	Integrated Dual 48K configurable transmit receive FIFO Buffers
	Data Rates Supported	10/100/1000 Mbps
	Compliance	IEEE 802.1P, 802,1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus Architecture	PCI-E 1.0a
	Data Path Width	X1, 250 MB/s, Bi-directional interface
	Data Transfer Mode	Bus-master DMA
	Hardware Certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power Requirement	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T
	Boot ROM Support	Yes
	Network Transfer Rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
	Operating Temperature	32° to 131°F (0° to 55° C)
	Operating Humidity	85% at 131° F (55° C)
	Dimensions	12.1 x 5.7 x 2.0 cm (4.75 x 2.25 x 0.8 in)
	Operating System Driver Support	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64, Windows Vista Business 32, Windows XP Professional, Windows XP x64. Red Hat Enterprise Linux 4 (RHEL4.8 or newer)*, Red Hat Enterprise Linux 5 (RHEL5.3 or newer), Red Hat Enterprise Linux 6 * RHEL WS4 not supported on Z200/Z200SFF
	Management Capabilities	WOL , PXE, DMI, WFM 2.0
	Kit Contents	Intel Gigabit CT Desktop NIC, low profile bracket, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement

© Copyright 2011 Hewlett-Packard Development Company, L.P.
The information contained herein is subject to change without notice.

All rights reserved. Microsoft, Windows, Windows Vista, and Windows XP are registered trademarks or trademarks of Microsoft Corporation in the U.S. and/or other countries. Intel, the Intel logo, Pentium, and Pentium Inside are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Linux is a registered trademark of Linus Torvalds in the United States and other countries.

Warranty - year(s) Protected by HP Services, including a 3 years parts, 3 years labour, and 3 years onsite service (3/3/3) standard warranty. Terms and conditions vary by country. Certain restrictions and exclusions apply.